ATGAGAGTGAAGGGGATCAGGAGGAATTATCAGCACTTGTGGAGATGGGGCACCATGCTCCTTGGGATGTTGATGATCTG
TAGTGCTGCAGATCAATTGTGGGTCACAGTCTATTATGGGGTGCCTGTGTGGAAAGAAGCAACCACCACTCTATTTTGTG
CATCAGATGCTAAAGCATATAGTACAGAGGTACATAATATTTGGGCCACACATGCCTGTGTACCCACAGACCCCAGCCCA
CAAGAAATAGTAATGGAAAATGTGACAGAAGAGTTCAACATGTGGAAAAATAACATGGTAGAACAGATGCATGAGGATAT
AATCAGTTTATGGGATGAAAGCCTAAAGCCATGTGTAAAATTAACTCCACTCTGTGTTACTCTAAATTGCACTACTGAGT
TGAATCTTCTAAATTGCATTGATAATAGTACTAATGATAAATGTATACCGCCAGATCAAAAAGGAGAAATGAAAAACTGC
TCTTTCAATATCACCGCAGGCATAAGAAATAAGGTGCGGAAAGAATATGCACTTTTTTATACAAGTGATGTAGCACCAAT
AGATAATGATACTATCAGTTATAGATTGATAAGTTGTAACACCTCAATCATTACACAGGCCTGTCCAAAGGTATCCTTTG
AGCCAATTCCCATACACTATTGTGCCCCGGCTGGTTTTGCGATTCTAAAGTGTAAGGATAGGAATTTCAATGGAACAGGA
CTATGTAAAAATGTCAGCACAGTACAATGTACACATGGAATTAGGCCAGTAGTATCAACTCAACTGCTGTTAAATGGCAG
TCTGGCAGAAAAAGAGATAGTAATTAGATCTGAAAATTTCACGGACAATGCTAAAACCATAATAGTACAGCTGCCTGAAA
TAGTACACATTAATTGTACAAGACCTAACAATAATATAAGAAAAGGTCTACGTATAGGACCAGGGAGAGCATGGTGGTAT
GCAACAAGAGGAATAATAGGAAAAATGAGACAAACACATTGCAACATTAGTAGAGTAAAATGGAATAACACTTTAGAACA
GATAGTTAAAAAATTAGGAGACAAATTTGGGACTAATAATAATAAAACAATAATATTTAATCAATCCTCAGGAGGGGACC
CAGAAATTACAATGCACACTTTTAATTGTGGAGGGGAATTTTTTTACTGTAATACAACACAACTGTTTAATAGTACTTGG
ATTCGGAATGGTACTGATTGGACTCGAAATGATACTGAAGGATCAGACATCACTAACGAAAATATCACGCTCCCATGTAG
AATAAAACAAATTATAAACATGTGGCAGAAAGTAGGGAAAGCAATGTATGCCCCTCCCATCAGTGGACAAATTAGCTGTT
CCTCAAATATTACAGGGCTGCTATTAACACACGATGGTGTTGTTGGTCTGTACACGGACGCGAACAACGTGACCTTCAGA
CCGGGAGGAGGAAATATGAGGGACAATTGGAGAAGTGAATTATATAAATATAAAGTAATAAAAGTTGAACCAATAGGAAT
AGCACCCACCAAGGCAAAGAGAAGAGTGGTGCAGAGAGAAAAAAGAGCAGTGGGAATAGCAGCTATGTTCCTTGGGTTCT
TGGGAACAGCAGGAAGCGCTATGGGCGCAGCGTCAGTGACGCTGACGGTACAAGCCAGACAATTATTGTCTGGTATAGTG
CAACAGCAGAACAATCTGCTGAGGGCTATTGAGGCGCAACAGCATATGTTGCAACTCACAGTCTGGGGCATCAAGCAGCT
CCAGGCAAGAGTCCTGGCTGTGGAAAGATACCTAAGGGATCAACAGCTCCTGGGAATTTGGGGTTGCTCTGGAAAACTCA
TTTGCACCACTGCTGTGCCTTGGAATAGTAGTTGGAGTAATAGATCTCTGGGAGACATTTGGGAAAATGATAACATGACC
TGGATGAAGTGGGAAAGAGAAATTGATAATTACACAAGCTATATATACACCTTAATTGAAGAATCGCAGAACCAGCAAGA
AAAGAATGAACTAGAATTATTGGAATTAGACAAATGGGACAGTTTGTGGAGTTGGTTTAGCATAACAAACTGGCTGTGGT
ATATAAAAATATTCATAATGATAGTAGGAGGCTTGATAGGTTTAAGAATAGTTTTTAGTGTGCTTTCTATAGTGAATAGA
GTTAGGCAGGGATACTCACCATTGTCGTTTCAGACCCGGCCCCCAGCCCCGAGGGGACCCGACAGGCCCGAAGGAATCGA
AGAAGAAGGTGGAGAGAGAGACAGAGACAGATCCGGCAGATTAGTGGATGGATTCTTAGCACTTATCTGGGTCGACCTGC
GGAGCCTGTGCCTCTTCAGCTACCACCGCTTGAGAGACTTACTCTTGATTGCAGCGAGGATTGTGGAACTCCTGGGACGC
AGGGGGTGGGAAGTCCTCAAGTATTGTTGGAATCTCCTACAGTACTGGAGTCAGGAACTAAAGAATAGTGCTGTTAGCTT
GCTTAATACCATAGCAATAGCAGTAGCTGAGGGGACAGATAGGGTTATAGAAATAATACAAAGAGCTTGTAGAGCTATTC
TCCACATACCTAGAAGAATAAGACAGGGCTTTGAAAGGGCTTTGCTATAA

FIG. 1

ATGAGAGTGAAGGGGATCAGGAAGAATTATCAGCACTTGTGGAGATGGGGCACCATACTCCTTGGGATGTTGATGATCTG
TAGTGCTGCAGATCAATTGTGGGTCACAGTCTATTATGGGGTGCCTGTGTGGAAAGAAGCAACCACCACTCTATTTTGTG
CATCAGATGCTAAAGCATATAGTACAGAGGTACATAATATTTGGGCCACACATGCCTGTGTACCCACAGACCCCAGCCCA
CAAGAAATAGTAATGGAAAATGTGACAGAAGAGTTCAACATGTGGAAAAATAACATGGTAGAACAGATGCATGAGGATAT
AATCAGTTTATGGGATGAAAGCCTAAAGCCATGTGTAAAATTAACTCCACTCTGTGTTACTCTAAATTGCACTACTGAGT
TGAATCTTCTAAATTGCATTGATAATAGTACTAGTGGTAATAACACTGATAATAGCACTAGTAGTAATAGTACTGATGAT
AAATGTATACCGCCAGATCAAAAAGGAAAAATGAAAAACTGCTCTTTCAATATCACCGCAGGCATAAGAGATAAGGTGCG
GAAAGAATATGCACTTTTTTATACAAGTGATGTAGCACCAATAGATAATGATGCTATCAGTTATAGATTGATAAGTTGTA
ACACCTCAATCATTACACAGGCCTGTCCAAAGGTATCCTTTGAGCCAATTCCCATACACTATTGTGCCCCGGCTGGTTTT
GCGATTCTAAAGTGTAAGGATAGGAATTTCAATGGAACAGGACTATGTAAAAATGTCAGCACAGTACAATGTACACATGG
AATTAGGCCAGTAGTATCAACTCAACTGCTGTTAAATGGCAGTCTGGCAAAAAAAGAGATAGTAATTAGATCTGAAAATT
TCACGGACAATGCTAAAACCATAATAGTACAGCTGCCTGAAATAGTACACATTAATTGTACAAGACCTAACAATAATATA
AGAAAAGGTCTACGTATAGGACCAGGGAGAGCATGGTGGTATGCAACAAGAGGAATAATAGGAAAAATGAGACAAACACA
TTGCAACATTAGTAGAGAAAAATGGAATAACACTTTAGAACAGATAGTTAAAAAATTAGGAGACAAATTTGGGACTAATA
ATAATAAAACAATAATATTTAATCAATCCTCAGGAGGGGACCCAGAAATTACAATGCACACTTTTAATTGTGGAGGGGAA
TTTTTTTACTGTAATACAACACAACTGTTTAATAGTACTTGGATTCGGAATGGTACTGATTGGACTCAAAATGATACTGA
AGGATCAGACATCACTAACGAAAATATCACGCTCCCATGTAGAATAAAACAAATTATAAACATGTGGCAGGAAGTAGGGA
AAGCAATGTATGCCCCTCCCATCAGTGGACAAATTAGCTGTTCATCAAATATTACAGGGCTGCTATTAACACACGATGGT
GTTGTTGGTCTGTACACGAACGCGAACAACGTGACCTTCAGACCGGGAGGAGGAAATATGAGGGACAATTGGAGAAGTGA
ATTATATAAATATAAAGTAATAAAAGTTGAACCAATAGGAATAGCACCCACCAAGGCAAAGAGAAGAGTGGTGCAGAGAG
AAAAAAGAGCAGTGGGAATAGGAGCTATGTTCCTTGGGTTCTTGGGAACAGCAGGAAGCGCTATGGGCGCAGCGTCAGTG
ACGCTGACGGTACAAGCCAGACAATTATTGTCTGGTATAGTGCAACAGCAGAACAATCTGCTGAGGGCTATTGAGGCGCA
ACAGCATATGTTGCAACTCACAGTCTGGGGCATCAAGCAGCTCCAGGCAAGAGTCCTGGCTGTGGAAAGATACCTAAGGG
ATCAACAGCTCCTGGGAATTTGGGGTTGCTCTGGAAAACTCATTTGCACCACTGCTGTGCCTTGGAATAGTAGTTGGAGT
AATAGATCTCTGGGAGACATTTGGGAAAATGATAACATGACCTGGATGAAGTGGGAAAGAGAAATTGATAATTACACAAG
CTATATATACACCTTAATTGAAGAATCGCAGAACCAGCAAGAAAAGAATGAACTAGAATTATTGGAATTAGACAAATGGG
ACAGTTTGTGGAGTTGGTTTAGCATAACAAACTGGCTGTGGTATATAAAAATATTCATAATGATAGTAGGAGGCTTGATA
GGTTTAAAAATAGTTTTTAGTGTGCTTTCTATAGTGAATAGAGTTAGGCAGGGATACTCACCATTGTCGTTTCAGACCCG
GCCCCCAGCCCCGAGGGGACCCGACAGGCCCGAAGGAATCGAAGAAGAAGGTGGAGAGAGAGACAGAGACAGATCCGGCA
GATTAGTGGATGGATTCTTAGCACTTATCTGGGTCGACCTGCGGAGCCTGTGCCTCTTCAGCTACCACCGCTTGAGAGAC
TTACTCTTGATTGCAGCGAGGATTGTGGAACTCCTGGGACGCAGGGGGTGGgAAGTCCTCAAGTATTGTTGGAATCTCCT
ACAGTACTGGAGTCAGGAACTAAAGAATAGTGCTGTTAGCTTGCTTAATACCATAGCAATAGCAGTAGCTGAGGGGACAG
ATAGGGTTATAGAAATAATACAAAGAGCTTGTAGAGCTATTCTCCACATACCTAGAAGAATAAGACAGGGCTTTGAAAGG
GCTTTGCTATAA

FIG. 2

atgagagtgaaggagaaatatcagcacttgtggagatgggggtggagatggggcaccatgctccttgggatgttgatgat
ctgtagtgctacagaaaaattgtgggtcacagtctattatggggtacctgtgtggaaggaagcaaccaccactctatttt
gtgcatcagatgctaaagcatatgatacagaggtacataatgtttgggccacacatgcctgtgtacccacagaccccaac
ccacaagaagtagtattggtaaatgtgacagaaaattttaacatgtggaaaaatgacatggtagaacagatgcatgagga
tataatcagtttatgggatcaaagcctaaagccatgtgtaaaattaaccccactctgtgttagtttaaagtgcactgatt
tgaagaatgatactaataccaatagtagtagcgggagaatgataatggagaaaggagagataaaaaactgctctttcaat
atcagcacaagcataagaggtaaggtgcagaaagaatatgcatttttttataaacttgatataatacccaatagataatga
tactaccagctataagttgacaagttgtaacacctcagtcattacacaggcctgtccaaaggtatcctttgagccaattc
ccatacattattgtgccccggctggttttgcgattctaaaatgtaataataagacgttcaatggaacaggaccatgtaca
aatgtcagcacagtacaatgtacacatggaattaggccagtagtatcaactcaactgctgttaaatggcagtctagcaga
agaagaggtagtaattagatctgtcaatttcacggacaatgctaaaaccataatagtacagctgaacacatctgtagaaa
ttaattgtacaagacccaacaacaatacaagaaaaagaatccgtatccagagaggaccagggagagcatttgttacaata
ggaaaaatagaaatatgagacaagcacattgtaacattagtagagcaaaatggaataacactttaaaacagatagctag
caaattaagagaacaatttggaaataataaaacaataatctttaagcaatcctcaggaggggacccagaaattgtaacgc
acagttttaattgtggaggggaatttttctactgtaattcaacacaactgtttaatagtacttggtttaatagtacttgg
agtactgaagggtcaaataacactgaaggaagtgacacaatcaccctcccatgcagaataaaacaaattataaacatgtg
gcagaaagtaggaaaagcaatgtatgcccctcccatcagtggacaaattagatgttcatcaaatattacagggctgctat
taacaagagatggtggtaatagcaacaatgagtccgagatcttcagacctggaggaggagatatgagggacaattggaga
agtgaattatataaatataaagtagtaaaaattgaaccattaggagtagcacccaccaaggcaaagagaagagtggtgca
gagagaaaaaagagcagtgggaataggagctttgttccttgggttcttgggagcagcaggaagcactatgggcgcagcct
caatgacgctgacggtacaggccagacaattattgtctggtatagtgcagcagcagaacaatttgctgagggctattgag
gcgcaacagcatctgttgcaactcacagtctggggcatcaagcagctccaggcaagaatcctggctgtggaaagatacct
aaaggatcaacagctcctggggatttggggttgctctggaaaactcatttgcaccactgctgtgccttggaatgctagtt
ggagtaataaatctctggaacagatttggaatcacacgacctggatggagtgggacagagaaattaacaattacacaagc
ttaatacactccttaattgaagaatcgcaaaaccagcaagaaaagaatgaacaagaattattggaattagataaatgggc
aagtttgtggaattggtttaacataacaaattggctgtggtatataaaattattcataatgatagtaggaggcttggtag
gtttaagaatagtttttgctgtactttctatagtgaatagagttaggcagggatattcaccattatcgtttcagacccac
ctcccaaccccgaggggacccgacaggcccgaaggaatagaagaagaaggtggagagagagacagagacagatccattcg
attagtgaacggatccttggcacttatctgggacgatctgcggagcctgtgcctcttcagctaccaccgcttgagagact
tactcttgattgtaacgaggattgtggaacttctgggacgcaggggtgggaagccctcaaatattggtggaatctccta
cagtattggagtcaggaactaaagaatagtgctgttagcttgctcaatgccacagccatagcagtagctgaggggacaga
tagggttatagaagtagtacaaggagcttgtagagctattcgccacatacctagaagaataagacagggcttggaaagga
ttttgctataa

FIG. 3

```
          1                                                  50
 HXB2     MRVK...EKY QHLWRWGWRW GTMLLGMLMI CSATEKLWVT VYYGVPVWKE
WEAU1.6   ----GIRKN- ---.....-K- .IM---I--- ---AEN---- ----------
AD3.V6    ----GIRRN- ---.....-R- GTM---M--- ---ADQ---- ----------
AD3.V22   ----GIRKN- ---.....-R- GTI---M--- ---ADQ---- ----------

          51                                                 100
 HXB2     ATTTLFCASD AKAYDTEVHN VWATHACVPT DPNPQEVVLV NVTENFNMWK
WEAU1.6   ---------- ----D----- V--------- --N---V-LE ----N-----
AD3.V6    ---------- ----S----- I--------- --S---I-ME ----E-----
AD3.V22   ---------- ----S----- I--------- --S---I-ME ----E-----

          101                                  V1            150
 HXB2     NDMVEQMHED IISLWDQSLK PCVKLTPLCV SLKCT..... ..........
WEAU1.6   -N-------- ------Q--- ---------- T-N--N.... .......VNV
AD3.V6    -N-------- ------E--- ---------- T-N--TELNL LNCID.....
AD3.V22   -N-------- ------E--- ---------- T-N--TELNL LNCIDNSTSG

          151  V1                                  V2           200
 HXB2     .DLKNDTNTN SSSGRMIM.. EKGEIKNCSF NISTSIRGKV QKEYAFFYKL
WEAU1.6   TNLKNETNT- -SSGGEKM.. EE-EM----- -VTTL--N-R KT---L--KL
AD3.V6    .........- -TNDKCIPPD QK-EM----- -ITAG--N-V RK---L--TS
AD3.V22   NNTDNSTSS- -TDDKCIPPD QK-KM----- -ITAG--D-V RK---L--TS
```

Fig. 4A

TOP SECRET 20060607

```
          201  V2  .<------------.                                  250
 HXB2     DIIPID..ND TTSYKLTSCN TSVITQACPK VSFEPIPIHY CAPAGFAILK
WEAU1.6   -VM---..R- NT--T-IN-K S-T------- ---------- ----------
AD3.V6    -VA---..N- TI--R-IS-N T-I------- ---------- ----------
AD3.V22   -VA---..N- KI--R-IS-N T-I------- ---------- ----------

          251                                                  300
 HXB2     CNNKTFNGTG PCTNVSTVQC THGIRPVVST QLLLNGSLAE EEVVIRSVNF
WEAU1.6   -NDKK---K- P-K------- ---------- ---------E EDI----E--
AD3.V6    -KDRN---T- L-K------- ---------- ---------E K-I----E--
AD3.V22   -KDRN---T- L-K------- ---------- ---------K K-I----E--

          301                                  V3>    350
 HXB2     TDNAKTIIVQ LNTSVEINCT RPNNNTRKRI RIQRGRSRA. FVTIGK.IGN
WEAU1.6   -----N---- -NVSLE---- -----T--KI TL..----VL YTTGEI.--D
AD3.V6    -----T---- -PEIVH---- -----I--GL RI..----AW WYATRGI--K
AD3.V22   -----T---- -PEIVH---- -----I--GL RI..----AW WYATRGI--K

          V3
          351 <-                                               400
 HXB2     MRQAHCNISR AKWNNTLKQI ASKLREQFG. .NNKTIIFKQ SSGGDFEIVT
WEAU1.6   I-RA---L-- TS-----K-- VE--REIKQF .K----V-K- --------VM
AD3.V6    M-QT---I-- VK-----E-- VK--GDKFGT NN----I-N- --------TM
AD3.V22   M-QT---I-- EK-----E-- VK--GDKFGT NN----I-N- --------TM
```

Fig. 4B

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```
          401                                  V4                    450
 HXB2     HSFNCGGEFF YCNSTQLFNS TWFNSTWSTE GSNNTEGSD. ...TITLPCR
WEAU1.6   -S-------- ---S------ --HANGT.WK N...---A-. ..NN------
AD3.V6    -T-------- ---T------ --IRNGTDWT R.ND---S-I TNEN------
AD3.V22   -T-------- ---T------ --IRNGTDWT Q.ND---S-I TNEN------

          451          CD4 BINDING                          V5500
 HXB2     IKQIINMWQK VGKAMYAPPI SGQIRCSSNI TGLLLTHDG. .GNSN.NESE
WEAU1.6   ------R--E ---------- E---R-L--- ------R--. .-SSEENQTE
AD3.V6    ------M--K ---------- S---S-S--- ------H--V V-LYTDANNV
AD3.V22   ------M--E ---------- S---S-S--- ------H--V V-LYTNANNV
              510                          gp120 ends
 HXB2     IFRPGGGDMR DNWRSELYKY KVVKIEPLGV APTKAKRRVV QREKR
```

Fig. 4C

atgagagtgaaggggatcaggaagaattatcagcacttgtggagatggggcaccatgctccttgggatattaatgatctg
tagtgctgcaggccaattgtgggtcacagtctattatggggtacctgtgtggaaagaagcaaccaccactctattttgtg
catcagatgctaaagcatatgatacagaggtacataatgtttgggccacacatgcctgtgtacccacagaccccaaccca
caagaagtagtattgggaaatgtgacagaaaattttaacatatggaaaaataacatggtagaacagatgcatgaggatat
aattagtttatgggatcaaagcctaaaaccatgtgtaaaattaaccccactctgtgttactctaaattgcactgatttga
ggaatgctactaataccactagtagtagcggggaaatgatggagagaggagaaataaaaaactgctctttcaatatcacc
acaagcataagagataaaatgcagaaagaatatgcacttttttataaacttgatgtagtaccaatagatactaataatac
taataccagctataggctggtaagttgtaacacctcagtcattacacaagcctgtccaaaggtatcctttgagccaattc
ccatacattattgtgccccggctggttttgcgattctaaaatgtaataataagacgttcaatgggagcggaccatgtaca
aatgtcagcacagtacaatgtacacatggaattaggccagtagtatcaactcaactgctgttaaatggcagtctagcaga
agaagagatagtaattagatctgaaaatatcacgaacaatgctaaaaccataatagtacagctgaaagaacctgtagaaa
ttaattgtacaagacccaacaacaatacaagaaaaagtatacatataggaccagggagagcattttatacaacaggagaa
ataataggagatataagacaagcacattgtaacattagtagagcaaaatggaatgacactttaagacagatagctaaaca
attaagagaacaatttaaaaataaaacaataatctttaatcaatccgtaggaggggacccagaaattgtaacgcacagtt
ttaattgtggaggggaatttttctactgtaattcagcacaactgtttaacagtacttggaatgatactgaaaggtcaaat
aacactagagaaaatgacacaacaatcacactcccatgcagaataaaacaaattataaacatgtggcaggaagtaggaaa
agcaatgtatgcccctcctatcagaggacaaattaaatgtgcatcaaatatcacagggctgctattaacaagagatggtg
gtaataacaatactgggaccaccgagaccttcagacctggaggaggagatatgagggacaattggagaagtgaattatat
aaatataaagtagtaaaaattgaaccattaggaatagcacccactaaggcaaagagaagagtggtgcagagagaaaaaag
agcagtgggaataggagctgtgttccttgggttcttgggagcagcaggaagcactatgggcgcagcgtcagtgacgctga
cggtacaagccagactattattgtctggtatagtgcaacagcaaaacaatctgctgagggctattgaggcgcaacagcat
ctgttgcaactcacagtctggggcatcaagcagctccaggcaagagtcctggctgtggaaagatacctaagggatcaaca
gctcctgggaatttggggttgctctggaaaactcatttgcaccactactgtgccttggaatactagttggagtaataaat
ctctggatacgatttggaataacatgacctggatgcagtgggaaagagaaattgacaattacacaggtttaatatacacc
ttacttgaagaatcgcagaaccaacaagaaaagaatgaacaagaattattggaattagataaatgggcaagtttgtggaa
ttggtttgacataacaaactggctgtggtatataaaaatattcataatgataataggaggcttggtaggtttaagaatag
tttttgctgtactttctatagtgaatagagttaggcagggatactcaccattatcgtttcagacccgcctcccagccccg
agggaacccgacagacccgaaggaatcgaagaagaaggtggagagagagacagagacagatccggtcgattagtggatgg
cttcttagcaatcatctgggtcgacctacggagcctgtgcctcttcagctaccaccgattgagagacttactcttgattg
taacgaggattgtggaacttctgggacgcaggggtgggaagccctcaaatactgggggaatctcctacagtattggagt
caggaactaaagaatagtgctgttagcttgctcaatgccacagccatagcagtagctgaggggacagatagggttataga
agtgttacaaagagcttgtagagctattctccacatacctgtaagaataagacagggcttggaaagggctttgctataa

FIG. 5

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          1                                                                                                  80

HXB2      MRVK...EKY QHLWRWG... .WRWGTMLLG MLMICSATEK LWVTVYYGVP VWKEATTTLF CASDAKAYDT EVHNVWATHA
92UG046-T8 -----IERN- ----ERNQHS LWR--I---- -----KG..E ---------- ---------- ------S-EP -A--I-----
93UG086-T8 -----IQRNC -N---..... ...---II-- -MI----A-- ---------- ---D-E---- ---------- ----------
92US077-T8 -----I-KN- ------S... ....TML--- ---------Q ---------- -----N---- ---------- -A--------
93US143-T8 -----IMKN- --F----... .....----- L------ADQ ---------- ----T----- ---------K --------M-
96USHIPS4-T8-----I-NNW -------... ....TML-.- ---------Q ---------- --R------- ----S----- -A--------
96USHIPS9-T8----EIMKN- --W--G-... .....I---- L------A-Q ---------- ---------- ---------- -K--------
96USSN20-T8 -----TQKS- PL---..... ...--.IIFW IMV--N-.-N ---------- --RD-E---- ---------- ----------
AD3.V6    ----GIRRN- ---..... .--------- -------ADQ ---------- ---------- --------S- ----I-----

          81                                                                                 V1              160

HXB2      CVPTDPNPQE VVLVNVTENF NMWKNDMVEQ MHEDIISLWD QSLKPCVKLT PLCVSLKCTD .LKNDTNTNS SSGRMIME..
92UG046-T8 --------R- IK-E------ ---------- ----V----- ---------- ----T-H--E .Y-APNA-IN ATD-D-....
93UG086-T8 ---------- IN-E------ -----N---- --T------- -------Q-- ----T-D-.. ........-DA TNATNTTIIS
92US077-T8 ---------- I--A----D- -----N---- ---------- ---------- ----T-N--- .VR-G-IVRN -TI-VEEGM.
93US143-T8 ----F----. I..-...--- --L--N---- D--------- ------T--- ----T-N--- DLR-A---TT NTNSN.W-KP
96USHIPS4-T8---------- -L-E------ ---------- ---------- ---------- -R--T----- .Y.EGNAN-T IDNATKNSW.
96SUHIPS9-T8---------- ---E------ -----N---- ---------- ---------- ----T-N-.. ..R-V-I--T TTNSSGW.KL
96USSN20-T8 ---------- IP-E------ -----N---- -------D-- ---------- ----T-N--H NFN-FNSS-N -TPINNTIYN
AD3.V6    ------D--- I-ME----E- -----N---- ---------- E--------- ----T-N--T ELNLLNCIDN -TNDKCIPPD

          161                    V2                                                                          240

HXB2      ..KGEIKNCS FNISTSIRGK VQKEYAFFYK LDIIPIDNDT .......... .TSYKLTSCN TSVITQACPK VSFEPIPIHY
92UG046-T8 ....GM---- --VT-EVIN- KKQ-H-L--- --VVQM-DNS TN........ .-N-R-IN-- ---------- -T--------
93UG086-T8 DM-------- --MT-ELKD- T--VRS---- M--VQ-N--N NSNSNSSQ.. ...-R-I--- ---------- ----------
92US077-T8 ..-E------ --VT--M-D- L---D----- S-V---G--N NTNTSNNNIT Y---R-R--- ---------- IN--------
93US143-T8 ME-------- -K-TS---D- ---Q--L--S --VV--K-NN NISNK..... .IR-R-R--- ---------- -T--------
96USHIPS4-T8..-------T --VT-A--D- -K-Q--L-HS --VV--KDAK DSN..... ..--R-I--- ---------- T-------Y-
96USHIPS9-T8MEE------- -K-T-IL-H- M-E-H-L--- S-VV-LG-NS AIGNNN.... .AR-R-I--- ---T------- ----------
96USSN20-T8 GMQ------- --TT-EL--- TK-Q--L-N- --VVQ-NDKN NSHSNNRR.. ...-M-IH-- ---------- -T--------
AD3.V6    .Q---M---- ---TAG--N- -R----L--T S-VA------ .......... .I--R-I--- ---------- ----------
```

Figure 6A

```
           241                                                                                                  320
                                                                                                                ↱
HXB2       CAPAGFAILK CNNKTFNGTG PCTNVSTVQC THGIRPVVST QLLLNGSLAE EEVVIRSVNF TDNAKTIIVQ LNTSVEINCT
92UG046-T8 ---------- --D-K----- --K------- ---------- ---------- --II---E-L -N-------- --E--P---S
93UG086-T8 ---------- -KD-E----- --R------- ----K----- ---------- -K-M---E-I ---T-N---- -TEP-K----
92US077-T8 ---------- ---R--E-K- --K------- ---------- ---------- KDI----A-- S----A---- --ET-Q----
93US143-T8 ---------- --D-K----- ---------- -----N---- ---------- -------E-- ---------- -KDP------
96USHIPS4-T8---------- ------S-K- Q-K------- -------A-- ---------- --II---D-- -N---I---- -KEP------
96USHIPS9-T8---------- -RD-K----- --KD------ ----K----- ---------- -DI----A-- S----I---- --KT-V----
96USSN20-T8 ---------- -KDQE---S- --N------- ----K----- ---------- RKIM---E-I -N-------- FTEP------
AD3.V6     ---------- -KDRN----- L-K------- ---------- ---------- K-I----E-- ---------- -PEI-H----

           321                                                                                          400
                      V3 ←──────────────────────────────────────────
HXB2       RPNNNTRKRI RIQR.GPGRA F.VTIGKI.G NMRQAHCNIS RAKWNNTLKQ IASKLREQFG ..NNKTIIFK QSSGGDPEIV
92UG046-T8 --YE-K-R-T P-...-L-Q. ..YYTT-LK- YI-P------ G-E--K--Q- V-K--GDL-. ..-QT----Q PH-------T
93UG086-T8 -------RG- S-...----- -.IARDR-I- DI-------- --A-----QK V-QQ--TH-. ..E-R----N H-A------T
92US077-T8 -------R-- TM...---AV Y.Y-T-D-I- DI-R------ KED-T----- --K----Q-- ..D----A-- P---------
93US143-T8 ---R-AW-G- P-..GV---K -.YARRN-T- DI---Y--L- I--------- -VE---LH-. ..K----V-N S--------I
96USHIPS4-T8--G-----S- H-...----- W.YAT-D-I- DI------L- SV------R- --K--G-Q-. ..QD-N-T-- ----------
96USHIPS9-T8--------G- N-...----T V.YAT---I- DI-------- KGE-Y----- VVT--G-H-. ..K----A-N K---------
96USSN20-T8 ---------V GV...----- V.YVTNA-I- DI------V- -----D---K VVTQ--KH-. ...-T--V-T KP----V--T
AD3.V6     -----I--GL --...----- WWYATRG-I- K---T----- -V------E- -VK--GDK-- TN-------N ---------T

           401                                                                                          480
                ┌──────→          V4 ←──────────────────────────                CD4
HXB2       THSFNCGGEF FYCNSTQLFN STWF..NSTW STEGSNNTEG .SDTITLPCR IKQIINMWQK VGKAMYAPPI SGQIRCSSNI
92UG046-T8 ---------- ---DTSR--- R-YSTSG--. ........GV NNS--K---- ---------G ---------- E-L-K-----
93UG086-T8 ---------- ---ST-G--- ---ASNA--. ...QGS-ST- SN-----Q-- -R---R---R --Q------- P-V---D---
92US077-T8 M--------- ----T-K--- ----..GNST RNNTEGSSN. .NGN---Q-- ---------G ---------- R---------
93US143-T8 L--------- ------K--- ----STTEGL NNT-..-... .E-P-V---- ---------E ---------- ADL-------
96USHIPS4-T8M--------- ----A----- -----.-G-- NNSTWNE-D. .TT------- ----V----T --R------- R-E-S-----
96USHIPS9-T8K-T------- ---D--K--T ---NYT-G-- NSTNWND-EM LNK------- ----V----E ---------- --L-T-----
96USSN20-T8 ---------- ----TS---- ---IINGTN. ...HTGPYDT ..------R-- ----VKT--R --Q------- P-V---D---
AD3.V6     M-T------- ----T----- ---IRNGTD- TRNDTEGSDI TNEN------ ---------- ---------- ----S-----
```

Figure 6B

Target Protein

```
                481                                                                                                  535
                          ┌──────► V5  ◄──┐                                                                  gp120 ends◄──┐
HXB2            TGLLLTRDGG NSNN..ESEI .FRPGGGDMR DNWRSELYKY KVVKIEPLGV APTKAKRRVV QREKRAVG.I GALFLGFLGA
92UG046-T8      ---------- ...-NTRQNE A--------- ---------- ---R-----L ---E------ E-----I-.L --M-------
93UG086-T8      ---I------ D...NNSTNE T--------- ---------- ---------- ---R------ E-----IAG- --V-------
92US077-T8      ---------- -T-DTNNT-- .--------- ---------- ---------I ---------- ------M-.- ----------
93US143-T8      ---------- VDE-SNTT-T .------N-- ---------- -A-------- ---------- --------.- --V-------
96USHIPS4-T8    ---------- -I-ETNGT-- .---A----- ---------- ---------I ---------- --------.V --M-----S-
96USHIPS9-T8    ---------- ..S-TNTT-V .------N-K ---------- ---------- ---------- --------.- ----------
96USSN20-T8     --I------- K...INSTNE T--------- ---------- ---------- ---H------ E-------V- --V-------
AD3.V6          ------H--V VGLYTDANNV T------N-- ---------- --I-V--I-I ---------- --------.- --M------T


HXB2            AGSTMGAASM TLTVQARQLL SGIVQQQNNL LRAIEAQQHL LQTLVWGIKQ LQARILAVER YLKDQQLLGI WGCSGKLICT
92UG046-T8      ---------- ---------M ---------- ---------- ---------- ---------S ---------- -----RH---
93UG086-T8      ---------L -----T---- -------S-- ---------- -K-------- ----V----- ---------- ----------
92US077-T8      ---------- ---------- ---------- -------H-- ---------- ----V----- ---------- ----------
93US143-T8      ---------I ---------- ---------- ---------- ---------- ----V----- ---------F ----------
96USHIPS4-T8    ---------V ---------- ---------- --------H- ---------- ----V----- --G------- ----------
96USHIPS9-T8    ---------L -----T---- ---------- ---------- ---------- ----V----- ---------- ----------
96USSN20-T8     --------AI ---------- -------S-- ---------- -K-------- ----V--L-- --R------- ----------
AD3.V6          ---A-----V ---------- ---------- ---------M ---------- ----V----- --R------- ----------


HXB2            TAVPWNASWS NKSLEQIW.. NHTTWMEWDR EINNYTSLIH SLIEESQNQQ EKNEQELLEL DKWASLWNWF NITNWLWYIK
92UG046-T8      ------S--- ----NE--.. GNM-----EK --D---E--Y -------T-- --------K- -Q-------- S--K------
93UG086-T8      -T----S--- ---YSE--.. DNM--LQ--K --S---QI-Y D--------- -----D--A- ----N----- D-SK-----R
92US077-T8      ---------- ----DK--.. -NM---Q-E- --D------Y T--------- ----L----- ----N----- D--K------
93US143-T8      ---------- ----DR--.. -NM-----E- --D---G--Y N--------- --------A- ---------- D---------
96USHIPS4-T8-T----T--- ----KY--.. DNM---Q--K --S---G--Y T--------- ----K----- ---------- D---------
96USHIPS9-T8-T-------- ----DD--.. QNM-----E- --D---NV-Y N--------- -----D--A- -------D-- S-S-------
96USSN20-T8 -N----S--- --TFND--.. .NM--LQ--K ------NT-Y R--------- -----D--A- -------S-- DLS------R
AD3.V6          ------S--- -R--GD--EN DNM---K-E- --D----Y-Y T--------- ----L----- ---D---S-- S---------
```

Figure 6C

```
HXB2          LFIMIVGGLV GLRIVFAVLS IVNRVRQGYS PLSFQTHLPT PRGPDRPEGI EEEGGERDRD RSIRLVNGSL ALIWDDLRSL
92UG046-T8    I--------I ---------- V--------- ------L--A ---------- ------QG-G ------T-FS --------N-
93UG086-T8    I--------I --------I- VI-------- -------LA-N -G-L---GR- ------Q--S ------S-F- --A-E-----
92US077-T8    I--------I ------VI-- ---------- ------R--A Q---------- -----G-G-- T-GP--D-F- -I--V-----
93US143-T8    I--------I ------T--- ---------- -------H-A Q-E------- -G--------- --GP--D-F- -I--V-----
96USHIPS4-T8  I--I-----I ------T--- ---------- ------R--- Q---------- ---------- --RTS-D-F- ----V-----
96USHIPS9-T8  I--------I ----I-T--- ---------- ------RF-A ---------- --G---K--- --GL----FF ----V-----
96USSN20-T8   I---V----I A--------A -I-------- -------LTHH Q-E------- --G---Q--- --V-----F- --A-------
AD3.V6        I--------I ------S--- ---------- ------RP-A ---------- ---------- --G---D-F- ----V-----

HXB2          CLFSYHRLRD LLLIVTRIVE LLG..... RRGWEALKYW WNLLQYWSQE LKNSAVSLLN ATAIAVAEGT DRVIEVVQGA
92UG046-T8    -----RH--- -I--AAK--- F-..... ---*
93UG086-T8    ---------- FI--AA-T-- ---HSSLKGL -L---G---L G---L--G-- --I--I--FD TI--VI-GW- -----IG-RI
92US077-T8    F--------- ----A----- ---..... -----I---- --------I-- ---------- ---------- --I---ARRT
93US143-T8    -I-L------ ---------- ---..... -----V---- ---------- -----IN--- ---------- -----IL-R-
96USHIPS4-T8  ---------- ----LA---- ---..... -----T-R-- ---------- ---------- SI--V----- --------RV
96USHIPS9-T8  ---------- ----AA---- ---..... -----I---- ---------- ---------- V--------- --IL--L-R-
96USSN20-T8   ---------- ----AA-T-- ---HSSLKGL -L--G----L ----S--G-- -----IN--D T------NW- -----IG-RF
AD3.V6        ---------- ----AA---- ---..... -----V---C ---------- ---------- TI-------- -----II-R-

HXB2          CRAIRHIPRR IRQGLERILL
92UG046-T8
93UG086-T8    G---LN---- ----A--A-Q
92US077-T8    F---L----- -------A--
93US143-T8    F---L---T- -------A--
96USHIPS4-T8  ---------- -------A--
96USHIPS9-T8  Y---I----- -------A--
96USSN20-T8   G---LN---- -------A-Q
AD3.V6        ----L----- ----F--A-
```

Figure 6D

92UG046-T8 (SEQ ID NO: 9)

ATGAGAGTGAAGGGGATAGAGAGGAATTATCAGCATTTGTGGGAGAGGAATCAGCACTCGTTGTGGAGATGGGGCATCAT
GCTCCTTGGGATGTTAATGATATGTAAAGGAGAATTGTGGGTCACAGTTTATTATGGGGTACCTGTGTGGAAAGAAGCAA
CCACTACTCTATTTTGTGCATCAGATGCTAAATCATATGAACCAGAGGCACATAATATCTGGGCTACACATGCCTGTGTG
CCAACAGACCCCAACCCACGAGAAATAAAACTGGAAAATGTCACAGAAAACTTTAACATGTGGAAAAATGACATGGTGGA
GCAGATGCATGAGGATGTAATCAGTCTATGGGATCAAAGCCTGAAACCATGTGTAAAATTAACCCCACTCTGTGTCACTT
TACATTGCACTGAATATAAGGCCCCTAATGCCACTATTAATGCCACTGATAGGGACATAGGAATGAAAAACTGCTCTTTC
AATGTAACCACAGAAGTAATAAATAAGAAGAAGCAAGAACATGCACTTTTTTATAAACTTGATGTGGTACAAATGGATGA
TAATAGTACTAATACCAACTATAGATTAATAAATTGTAATACCTCAGTCATTACACAGGCGTGTCCAAAGGTAACCTTTG
AGCCAATTCCCATACATTATTGTGCTCCAGCTGGATTTGCGATTCTAAAGTGTAATGATAAGAAGTTCAATGGGACGGGT
CCATGCAAAAACGTCAGCACAGTGCAGTGTACACATGGGATTAGGCCAGTAGTGTCAACCCAACTGTTGTTGAATGGCAG
TCTAGCAGAAGAAGAGATAATAATTAGATCTGAAAATCTCACAAATAATGCTAAAACCATAATAGTACAGCTTAATGAGT
CTGTACCAATTAATTGCTCAAGGCCCTACGAAAATAAAAGACGACGTACACCTATAGGACTAGGGCAAGCGTACTATACA
ACAAAATTAAAAGGATATATAAGACCAGCACATTGTAATATTAGTGGAGCAGAATGGAATAAAACTTTACAACAGGTAGC
TAAAAAATTAGGAGACCTTTTCAACCAGACAACAATAATTTTTCAACCACACTCGGGAGGGGACCCAGAAATTACAACAC
ACAGCTTTAATTGTGGAGGGGAATTTTTCTACTGCGATACATCAAGACTGTTTAATAGGACTTATAATACATCAGGTAGT
ACAGGGGTAAATAACAGTACAATCAAACTCCCATGCAGAATAAAACAAATTATAAACATGTGGCAGGGAGTAGGAAAAGC
AATGTATGCCCCTCCCATTGAAGGACTAATCAAATGTTCATCAAACATTACAGGACTATTGTTGACAAGAGATGGGGGAA
ATAATACTAGGCAGAATGAAGCCTTCAGGCCTGGAGGAGGGGATATGAGAGACAATTGGAGAAGTGAATTATACAAATAT
AAAGTAGTAAGAATTGAACCACTAGGTCTAGCACCCACTGAGGCAAAGAGAAGAGTGGTAGAAAGAGAAAAAAGAGCAAT
AGGACTAGGAGCTATGTTCCTTGGGTTCTTGGGAGCAGCAGGAAGCACGATGGGCGCAGCGTCAATGACGCTGACGGTAC
AGGCCAGACAGTTAATGTCTGGTATAGTGCAACAGCAAAACAATTTGCTGAGGGCTATAGAGGCGCAACAGCATCTGTTG
CAACTCACAGTCTGGGGCATTAAACAGCTCCAGGCAAGAATCCTGGCTGTGGAAAGCTACCTAAAGGATCAACAGCTCCT
AGGAATTTGGGGTTGCTCTGGAAGACACATTTGCACCACTGCTGTGCCCTGGAACTCTAGCTGGAGTAATAAATCTCTAA
ACGAGATTTGGGGTAACATGACCTGGATGGAGTGGGAAAAAGAAATTGACAATTACACAGAATTAATATACAGCTTAATT
GAAGAATCGCAAACCCAGCAAGAAAAGAATGAACAAGAACTATTGAAATTAGACCAATGGGCAAGTTTGTGGAATTGGTT
TAGCATAACAAAATGGCTGTGGTATATAAAAATATTCATAATGATAGTAGGAGGCTTGATAGGTTTAAGAATAGTTTTTG
CTGTGCTTTCTGTAGTAAATAGAGTTAGGCAGGGATATTCACCTCTGTCATTTCAGACCCTCCTCCCAGCCCCGAGGGGA
CCCGACAGGCCAGAAGGAATAGAAGAAGAAGGTGGAGAGCAGGGCAGAGGCAGATCCATTCGATTGGTGACCGGATTCTC
AGCACTTATCTGGGACGATCTAAGGAACCTGTGCCTCTTCAGCTACCGCCACTTGAGAGACTTAATCTTAATTGCAGCGA
AGATTGTGGAGTTTCTGGGACGCAGGGGGTGAGAAGCCATCAAGTACCTGTGGAACCTCCTGCAATATTGGATTCAGGAA
CTAAAGAATAGTGCTATTAGCTTATTTGATACCACAGCAATAGCAGTAGCTGAGGGGACAGATAGGGTCATAGAGATATT
ACAAAGATTTATTAGAGCTATTCTTCACATACCCAGACGAATAAGACAGGGCTTGGAAAGGGCTTTACTATAA

Fig. 7

93UG086-T8 (SEQ ID NO: 11)

ATGAGAGTGAAGGGGATACAGAGGAACTGTCAAAACTTGTGGAGATGGGGAACTATAATCTTGGGTATGATGATAATTTG
TAGTGCTGCAGAAAAATTGTGGGTTACTGTTTACTATGGGGTACCTGTGTGGAAAGATGCAGAAACCACCTTATTTTGTG
CATCAGATGCGAAAGCATATGATACAGAAGTGCATAATGTCTGGGCCACACATGCCTGTGTACCTACAGACCCCAACCCA
CAAGAAATAAATTTGGAAAATGTGACAGAAAATTTTAACATGTGGAAAAATAACATGGTAGAGCAGATGCATACAGATAT
AATCAGTCTATGGGACCAAAGCCTAAAGCCATGTGTACAGTTAACCCCTCTCTGTGTTACTTTAGATTGTACTGATGCCA
CAAATGCCACTAATACCACTATCATTAGTGACATGAAAGGAGAAATAAAAAACTGCTCTTTCAATATGACCACAGAATTA
AAGGATAAGACACAGAAAGTACGTTCATTTTTCTATAAGATGGATATAGTACAAATTAACAACAACAACAGCAACAGCAA
CAGTAGTCAGTATAGATTAATAAGTTGTAATACCTCAACCATTACACAAGCTTGTCCAAAGGTATCCTTTGAGCCAATTC
CCATACATTATTGTGCTCCAGCTGGTTTTGCGATTCTAAAATGCAAGGATAAGGAGTTCAATGGAACAGGGCCATGCAGG
AATGTCAGCACAGTACAATGCACACATGGAATCAAGCCAGTAGTATCAACTCAACTACTGTTAAATGGCAGTCTAGCAGA
AGAAAAGGTAATGATTAGATCTGAAAATATCACAGACAATACTAAAAACATAATAGTGCAACTTACTGAGCCTGTAAAAA
TTAATTGTACCAGACCTAACAACAATACAAGAAGAGGTATAAGTATAGGGCCAGGACGAGCATTCATTGCAAGAGATAGA
ATAATAGGGGATATAAGACAAGCACATTGTAACATCAGTAGAGCAGCATGGAATAACACTTTGCAGAAGGTAGCCCAACA
ATTAAGAACACACTTTGAGAACAGAACAATAATCTTTAATCACTCCGCAGGAGGGGACCCAGAAATAACTACACATAGTT
TTAATTGTGGAGGAGAATTTTTCTATTGTAGCACAACAGGCCTGTTTAATAGTACTTGGAATAGCAATGCCAGCACGCAG
GGGTCAAATAGCACGGGTTCAAACGACACTATAACTCTCCAATGCAGAATAAGGCAGATTATAAGGATGTGGCAGAGAGT
AGGACAAGCAATGTATGCCCCTCCCATCCCAGGGGTAATAAGATGTGACTCAAACATTACAGGACTAATATTAACAAGAG
ATGGGGGGGATAATAACAGCACAAATGAGACCTTCAGACCTGGAGGAGGAGATATGAGGGACAATTGGAGAAGTGAATTA
TATAAGTATAAAGTAGTAAAGATTGAACCACTAGGAGTAGCACCCACCAGGGCAAAGAGAAGAGTGGTGGAAAGAGAAAA
AAGAGCAATAGCAGGAATAGGAGCTGTGTTCCTTGGGTTCTTGGGAGCAGCAGGAAGCACAATGGGCGCAGCGTCACTGA
CGCTGACGGTACAGACCAGACAGCTATTGTCTGGCATAGTGCAACAGCAAAGCAATTTGCTGAGGGCTATAGAGGCTCAA
CAGCATCTGTTGAAACTCACGGTCTGGGGCATTAAACAGCTCCAGGCACGAGTCCTGGCTGTGGAGAGATACCTAAAGGA
TCAACAGCTCCTAGGAATTTGGGGTTGCTCTGGAAAACTCATTTGCACCACTACTGTGCCCTGGAACTCTAGTTGGAGTA
ATAAATCCTATAGTGAGATATGGGACAACATGACCTGGCTGCAATGGGATAAAGAAATTAGCAATTATACACAAATAATA
TATGATCTAATTGAAGAATCACAGAACCAGCAGGAAAAGAATGAACAAGACCTATTGGCATTGGACAAGTGGGCAAATCT
ATGGAATTGGTTTGACATATCAAAATGGCTGTGGTATATAAGAATATTTATAATGATAGTAGGAGGCTTAATAGGATTAA
GAATAGTTTTTGCTGTAATTTCAGTAATAAATAGAGTTAGGCAGGGATACTCACCTTTGTCGTTCCAGACCCTTGCCCCG
AACCCAGGGGGTCTCGACAGGCCCGGAAGAATCGAAGAAGAAGGTGGAGAGCAAGACAGAAGCAGATCGATTCGCTTAGT
CAGCGGGTTCTTAGCACTTGCCTGGGAGGACCTGCGGAGCCTGTGCCTCTTCAGCTACCACCGCTTGAGAGACTTCATCT
TGATTGCCGCGAGGACTGTGGAACTTCTGGGACACAGCAGTCTCAAGGGGTTGAGACTGGGGTGGGAAGGACTCAAGTAT
CTGGGGAATCTCCTGTTGTATTGGGGTCAGGAACTAAAAATTAGTGCTATTAGTTTGTTTGATACCATAGCAATAGTAAT
AGCTGGCTGGACAGATAGGGTCATAGAAATAGGACAAAGAATTGGTAGAGCTATTCTCAACATACCTAGAAGAATCAGGC
AGGGCGCCGAAAGGGCTTTACAATAA

Fig. 8

92US077-T8 (SEQ ID NO: 13)

ATGAGAGTGAAGGGGATCAGGAAGAATTATCAGCACTTGTGGAGATGGAGTACCATGCTGCTCCTTGGGATGTTAATGAT
TTGTAGTGCTACAGAACAATTGTGGGTCACAGTCTATTATGGGGTACCTGTGTGGAAAGAAGCAAACACCACTCTATTTT
GTGCATCAGATGCTAAAGCATATGATACAGAGGCACATAATGTTTGGGCCACACATGCCTGTGTACCCACAGACCCCAAC
CCACAAGAAATAGTATTGGCAAATGTGACAGAAGATTTTAACATGTGGAAAAATAACATGGTAGAACAGATGCATGAGGA
TATAATCAGTTTATGGGATCAAAGCCTAAAGCCATGTGTAAAATTAACCCCACTCTGTGTTACTTTAAATTGCACTGATG
TAAGGAATGGTACTATTGTGAGGAATAGTACTATTAGGGTCGAGGAAGGGATGAAGGAAGAAATAAAAAACTGCTCTTTC
AATGTCACCACAAGCATGAGAGACAAGTTGCAGAAAGAAGATGCATTTTTTTATAAATCTGATGTAATACCAATAGGTAA
TGATAATAATACTAATACCAGCAATAATAATATCACCTATACCAGCTATAGGTTGAGAAGTTGTAATACCTCAGTCATTA
CACAGGCCTGTCCAAAGATAAACTTTGAGCCAATTCCCATACATTATTGTGCCCCGGCTGGGTTTGCGATTCTGAAGTGT
AATAATAGGACGTTCGAGGGAAAAGGACCATGTAAAAATGTCAGCACAGTACAATGTACACATGGAATTAGGCCAGTAGT
ATCAACTCAACTGCTGTTAAATGGCAGTCTAGCAGAAAAAGATATAGTAATTAGATCTGCCAATTTCTCAGACAATGCTA
AAGCCATAATAGTACAGCTGAACGAAACTGTACAAATCAATTGTACAAGACCCAACAACAATACAAGAAGAAGAATAACT
ATGGGACCAGGAAGAGTATATTATACAACAGGAGACATAATAGGAGACATAAGACGAGCACATTGTAACATTAGTAAGGA
AGATTGGAATAACACTCTAAAACAGATAGCTAAAAAATTAAGAGAACAATTTGGGGATAATAAAACAATAGCCTTTAAGC
CATCCTCAGGAGGGGACCCAGAAATTGTAATGCACAGTTTTAATTGTGGAGGGGAATTTTTCTACTGTAATACAACAAAA
CTGTTTAATAGTACTTGGGATGGTAATAGTACTCGGAATAATACTGAAGGGTCAAGTAACAATGGAAATATCACACTTCA
ATGCAGAATAAAACAAATTATAAACATGTGGCAGGGAGTAGGAAAAGCAATGTATGCCCCTCCCATCAGAGGACAAATTA
GATGTTCATCAAACATTACAGGGCTGCTATTAACAAGAGATGGTGGTAATACCAACGATACTAACAATACTGAGATCTTC
AGACCTGGAGGAGGAGATATGAGGGACAATTGGAGAAGTGAATTATATAAATATAAAGTAGTAAAAATTGAACCATTAGG
AATAGCACCCACCAAGGCAAAGAGAAGAGTGGTGCAAAGAGAAAAAAGAGCAATGGGAATAGGAGCTCTGTTCCTTGGGT
TCTTGGGAGCAGCAGGAAGCACTATGGGCGCAGCGTCAATGACGCTGACGGTACAGGCCAGACAACTATTGTCTGGTATA
GTGCAACAGCAGAACAATTTGCTGAGGGCTATTGAGGCGCAACACCATCTGTTGCAACTCACAGTCTGGGGCATCAAGCA
GCTCCAGGCAAGAGTCCTGGCTGTGGAAAGATACCTAAAGGATCAACAGCTCCTGGGGATTTGGGGTTGCTCTGGAAAAC
TCATTTGCACCACTGCTGTGCCTTGGAATGCTAGTTGGAGTAATAAATCTCTGGATAAGATTTGGAATAACATGACCTGG
ATGCAGTGGGAAAGAGAAATTGACAATTACACAAGTCTAATATACACTTTAATTGAAGAATCGCAGAACCAACAAGAAAA
GAATGAACTAGAGTTACTAGAATTAGATAAATGGGCAAATTTGTGGAATTGGTTTGACATAACAAAATGGCTGTGGTATA
TAAAAATATTCATAATGATAGTAGGAGGCTTGATAGGTTTAAGAATAGTTTTTGTTATACTTTCTATAGTGAATAGAGTT
AGGCAGGGATACTCACCATTATCGTTTCAGACCCGCCTCCCAGCCCAGAGGGGACCCGACAGGCCCGAAGGAATCGAAGA
AGAAGGTGGAGGGAGAGGCAGAGACACATCCGGGCCATTAGTGGATGGATTCTTAGCAATTATCTGGGTCGACCTGCGGA
GCCTGTTCCTCTTCAGCTACCACCGCTTGAGAGACTTACTCTTGATTGTAGCGAGGATTGTGGAACTTCTGGGACGCAGG
GGGTGGGAAATCCTCAAGTATTGGTGGAATCTCCTACAGTATTGGATTCAGGAACTAAAGAATAGTGCTGTTAGCTTGCT
CAACGCCACAGCCATAGCAGTAGCTGAGGGGACAGATAGGATTATAGAAGTAGCAAGAAGGACTTTTAGAGCTATTCTCC
ACATACCTAGAAGAATAAGACAGGGCTTGGAAAGGGCTTTGCTATAA

Fig. 9

93US143-T8 (SEQ ID NO: 15)

atgagagtgaaggggatcatgaaGAATTATCAGCACTTTTGGAGATGGGGCACCATGCTCCTGGGGTTATTGATGATCTG
TAGTGCTGCAGATCAATTGTGGGTCACAGTCTATTATGGAGTACCTGTGTGGAAGGAAACAACCACCACTCTATTTTGTG
CATCAGATGCTAAAGCATATGATAAAGAGGTACATAATGTTTGGGCCACACATGCCTGTGTACCCACAGACCCCAACCCA
CAAGAAATACCATTGGTAAATGTAACAGAAAATTTTAACATGTGGAAAAATAACATGGTAGATCAAATGCATGAGGATAT
AATCAGTTTATGGGATCAAAGCCTAAAGCCATGTGTAAAATTAACCCCACTCTGTGTTACTTTAAATTGCACTGATGATT
TGAGGAATGCTACTAATACCACTACTAATACCAATAGTAATTGGGAGAAACCAATGGAGAAAGGAGAAATAAAAAACTGC
TCTTTCAAAATCACCTCAAGCATAAGAGATAAGGTACAGAAACAATATGCACTTTTTTATAGCCTTGATGTAGTACCAAT
AAAGAATAACAATAATATTAGCAATAAGATTAGATATAGGTTAAGAAGTTGTAACACCTCAGTCATTACACAGGCCTGTC
CAAAGGTAACCTTTGAGCCAATTCCCATACATTATTGTGCCCCGGCTGGTTTTGCGATTCTAAAATGTAATGATAAGAAG
TTCAATGGAACAGGACCATGTACAAATGTCAGCACAGTACAATGTACTCATGGAATTAGGCCAGTAGTATCAACTCAACT
ACTGTTAAATGGCAGTCTAGCAGAAGAAGAGGTAGTAATTAGATCTGAAAATTTCACAGACAATGCTAAAACCATAATAG
TACAACTGAAAGACCCTGTAGAAATCAATTGTACAAGACCCAACAGAAATGCATGGAAAGGCATACCTATTGGAGTACCA
GGGAGAAAATTCTATGCAAGAAGAAACATAACAGGAGATATAAGACAAGCATATTGTAACCTTAGTATAGCAAAGTGGAA
TAACACTTTAAAACAGATAGTTGAAAAATTAAGATTACATTTTAAAAATAAAACAATAGTCTTTAATAGTTCCTCAGGGG
GGGACCCAGAAATTATACTGCACAGTTTTAATTGTGGAGGGGAATTTTTCTATTGTAATTCAACAAAACTGTTTAATAGT
ACTTGGAATAGTACTACTGAAGGGTTAAATAACACTGGAGAAGACCCAATCGTACTCCCATGCAGAATAAAGCAAATTAT
AAACATGTGGCAGGAAGTAGGAAAAGCAATGTATGCCCCTCCCATCGCAGACCTAATTAGATGCTCATCAAATATTACAG
GGCTGCTATTAACAAGAGATGGTGGTGTTGATGAGAACAGCAACACCACCGAGACCTTCAGGCCTGGAGGAGGAAATATG
AGGGACAATTGGAGAAGTGAATTATATAAATATAAAGCAGTAAAAATTGAACCCTTAGGGGTAGCACCCACCAAGGCAAA
GAGAAGAGTGGTGCAGAGAGAAAAAAGAGCAGTGGGAATAGGAGCTGTGTTCCTTGGGTTCTTGGGAGCAGCAGGAAGCA
CTATGGGCGCAGCATCAATAACGCTGACGGTACAGGCCAGACAATTATTGTCTGGTATAGTGCAACAGCAGAACAATTTG
CTGAGGGCTATTGAGGCGCAACAGCATCTGTTGCAACTCACAGTCTGGGGCATCAAGCAGCTCCAGGCGAGAGTCCTGGC
TGTGGAAAGATACCTAAAGGATCAACAGCTCCTGGGATTTTGGGGTTGCTCTGGAAAACTCATCTGCACCACTGCTGTGC
CTTGGAATGCTAGTTGGAGTAATAAATCTCTGGATAGGATTTGGAATAATATGACCTGGATGGAGTGGGAAAGAGAAATT
GACAATTACACAGGCTTAATATACAACTTAATTGAAGAATCGCAAAACCAACAAGAAAAGAATGAACAAGAATTATTAGC
ATTAGATAAATGGGCAAGTTTGTGGAATTGGTTTGACATAACAAACTGGCTGTGGTATATAAAAATATTCATAATGATAG
TAGGAGGCTTGATAGGTTTAAGAATAGTTTTTACTGTACTTTCTATAGTGAATAGAGTTAGGCAGGGATACTCACCATTA
TCGTTTCAGACCCACCACCCAGCTCAGAGGGAACCCGACAGGCCCGAAGGAATCGAAGGAGAAGGTGGAGAGAGAGACAG
AGACAGATCCGGTCCCTTAGTGGATGGATTCTTAGCAATTATCTGGGTCGACCTGCGGAGCCTGTGCATCTTCCTCTACC
ACCGCTTGAGAGACTTACTCTTGATTGTAACGAGGATTGTGGAACTTCTGGGACGCAGGGGGTGGGAAGTCCTCAAATAT
TGGTGGAATCTCCTACAGTATTGGAGTCAGGAACTAAAGAATAGTGCTATTAACTTGCTCAACGCCACAGCCATAGCAGT
AGCTGAGGGGACAGATAGGGTTATAGAAATATTACAAAGAGCTTTTAGAGCTATTCTCCACATACCTACAAGAATAAGAC
AGGGCTTGGAAAGGGCTTTGCTATAA

Fig. 10

96USSHIPS4-T8 (SEQ ID NO: 17)

ATGAGAGTGAAGGGGATCAGGAACAATTGGCAGCACTTATGGAGATGGGGCACCATGCTCCTTGGGATGTTGATGATCTG
TAGTGCTACAGAACAATTGTGGGTCACAGTCTATTATGGGGTTCCTGTGTGGAGAGAAGCAACAACCACTCTATTCTGTG
CATCAGATTCTAAAGCATATGATACAGAGGCACATAATGTTTGGGCCACACATGCCTGTGTACCCACAGACCCCAACCCA
CAAGAAGTATTATTGGAAAATGTGACAGAAAATTTTAACATGTGGAAAAATGACATGGTAGAACAGATGCATGAGGATAT
AATCAGTCTATGGGATCAAAGCCTAAAGCCATGTGTAAAACTAACCCCACGTTGTGTTACTTTAAAGTGCACTGATTATG
AGGGAAATGCTAATAATACCATTGATAATGCCACTAAAAATAGCTGGAAAGGAGAAATAAAAAATTGCACTTTCAATGTC
ACCACAGCCATAAGAGATAAGGTGAAGAAACAATATGCACTTTTTCATAGTCTTGATGTAGTCCCAATAAAAGATGCTAA
GGATAGTAACAGCTATAGGTTGATAAGTTGTAACACCTCAGTCATTACACAGGCTTGTCCAAAGACATCCTTTGAGCCAA
TTCCCATATATTATTGTGCCCCGGCTGGGTTTGCGATTCTAAAATGTAACAATAAGACATTCAGTGGAAAAGGACAATGT
AAAAATGTCAGCACAGTACAATGTACACATGGAATTAGGCCAGTAGCATCAACTCAACTGCTGTTAAATGGCAGTCTAGC
AGAAGAAGAGATAATAATTAGATCTGACAATTTCACAAACAATGCTAAAATCATAATAGTACAGCTGAAAGAACCTGTAG
AAATTAATTGTACAAGGCCCGGCAACAATACAAGAAAAAGTATACATATAGGACCAGGGAGAGCATGGTATGCAACAGGA
GATATAATAGGAGATATAAGACAAGCACATTGCAACCTTAGTAGTGTAAAATGGAATAACACTTTAAGACAGATAGCTAA
AAAATTAGGAGAACAATTTCAGGATAAAAATATAACCTTTAAGCAATCCTCAGGAGGGGACCCAGAAATTGTAATGCACA
GTTTTAATTGTGGGGGGGAATTTTTCTACTGTAATGCAACACAACTGTTTAATAGTACCTGGGATAATGGTACTTGGAAT
AACAGTACTTGGAATGAAACTGATACTACCACTATCACACTCCCATGCAGGATAAAACAAATTGTAAACATGTGGCAGAC
AGTAGGAAGAGCAATGTATGCCCCTCCCATTAGAGGAGAAATTAGTTGTTCATCAAATATTACAGGGCTGCTATTAACAA
GAGATGGTGGTAATATAAATGAGACAAATGGGACTGAGATCTTTAGACCTGCAGGAGGAGATATGAGGGACAATTGGAGA
AGTGAATTATATAAATATAAAGTAGTAAAAATTGAACCATTAGGAATAGCACCCACCAAGGCAAAGAGAAGAGTGGTGCA
GAGAGAAAAAAGAGCAGTGGGAGTAGGAGCTATGTTCCTTGGGTTCTTGTCAGCAGCAGGAAGCACTATGGGCGCAGCGT
CAGTGACGCTGACGGTACAGGCCAGACAATTATTGTCTGGTATAGTGCAACAGCAGAACAATTTGCTGAGGGCTATTGAG
GCGCAACATCATCTGTTGCAACTCACAGTCTGGGGCATCAAGCAGCTCCAGGCAAGAGTCCTGGCTGTGGAAAGATACCT
AGGGGATCAACAGCTCCTGGGGATTTGGGGTTGCTCTGGAAAACTCATCTGCACCACTACTGTGCCTTGGAATACTAGTT
GGAGTAATAAATCACTGAAATACATTTGGGATAACATGACCTGGATGCAGTGGGATAAAGAAATTAGCAATTACACAGGC
TTAATATACACCTTAATTGAGGAATCGCAGAACCAGCAAGAAAAGAATGAAAAGGAACTACTGGAATTGGATAAATGGGC
AAGTTTGTGGAATTGGTTTGACATAACAAACTGGCTGTGGTATATAAAAATATTCATAATAATAGTAGGAGGCTTGATAG
GTTTAAGAATAGTTTTTACTGTACTTTCTATAGTGAATAGAGTTAGGCAGGGATACTCACCACTATCGTTTCAGACCCGC
CTCCCAACCCAGAGGGGACCCGACAGGCCCGAAGGAATCGAAGAAGAAGGTGGAGAGAGAGACAGAGACAGATCAAGAAC
ATCAGTGGATGGATTCTTAGCACTTATCTGGGTCGATCTACGGAGCCTGTGCCTCTTCAGCTACCACCGCTTGAGAGACT
TACTCTTGATTCTAGCGAGGATTGTGGAACTTCTGGGACGCCGGGGGTGGGAAACCCTCAGATATTGGTGGAATCTCCTA
CAGTATTGGAGTCAGGAACTAAAGAATAGTGCTGTTAGCTTGCTTAATTCTATAGCCATAGTAGTAGCTGAGGGAACAGA
TAGGGTTATAGAAGTAGTACAGAGAGTTTGTAGAGCTATCCGCCACATACCTAGAAGAATAAGACAGGGCTTGGAAAGGG
CTTTGCTATAA

Fig. 11

96USHIPS9-T8 (SEQ IS NO: 19)

atgagagTgaaggagatcatgaaaaattatcagcACTGGTGGAGAGGGGGCATCATGCTCCTTGGGTTGTTAATGATCTG
TAGTGCTGCTGAACAATTGTGGGTCACAGTCTATTATGGGGTACCCGTGTGGAAAGAAGCAACCACCACTCTATTCTGTG
CATCTGATGCTAAAGCATATGATACAGAGAAACATAATGTTTGGGCCACACATGCCTGTGTACCTACAGACCCCAACCCA
CAAGAAGTAGTATTGGAAAATGTGACAGAAAATTTTAACATGTGGAAAAATAACATGGTAGAACAGATGCATGAGGATAT
AATCAGTTTATGGGATCAAAGTCTAAAGCCATGTGTAAAACTAACCCCACTCTGTGTCACTTTAAACTGTAGGAACGTTA
CTATTACCAATACTACTACCAATAGTAGTGGCTGGAAACTAATGGAGGAAGGAGAAATAAAAAACTGCTCTTTCAAAATC
ACCACAATACTGAGACATAAGATGCAGGAAGAACATGCACTTTTTTATAAATCAGATGTAGTACCACTAGGTAATAATAG
TGCAATAGGTAATAATAATGCCAGATATAGGTTGATAAGTTGTAACACCTCAACCATTACACAGGCCTGTCCAAAGGTAT
CCTTTGAGCCAATTCCCATACATTATTGTGCCCCGGCTGGTTTTGCGATTCTAAAATGTAGAGATAAGAAGTTCAATGGA
ACAGGACCATGTAAAGATGTCAGCACAGTACAATGTACACATGGAATTAAGCCAGTAGTATCAACTCAACTACTGTTAAA
TGGCAGTCTAGCAGAAGAAGATATAGTAATTAGATCTGCCAATTTCTCAGACAATGCTAAAATCATAATAGTACAGCTGA
ATAAAACTGTAGTAATTAATTGTACAAGACCCAACAATAATACAAGAAAAGGTATAAATATAGGACCAGGAAGAACAGTT
TATGCAACAGGAAAAATAATAGGAGATATAAGACAAGCACATTGTAACATTAGTAAAGGAGAATGGTATAACACTTTAAA
GCAGGTAGTTACAAAATTAGGAGAACATTTTAAGAATAAAACAATAGCCTTTAATAAATCCTCAGGAGGGGACCCAGAAA
TTGTAAAGCACACTTTTAATTGTGGAGGGGAATTTTTCTACTGTGATTCAACAAAATTGTTTACTAGTACTTGGAACTAT
ACTAATGGTACTTGGAATAGTACTAACTGGAATGATACTGAAATGTTGAATAAAACAATCACACTCCCATGCAGAATAAA
ACAAATTGTAAACATGTGGCAGGAAGTAGGGAAAGCAATGTATGCCCCTCCCATCAGCGGACTTATTACATGTTCATCAA
ATATTACAGGACTACTATTAACAAGAGATGGTGGTAGTAACACGAACACCACCGAGGTCTTCAGACCTGGAGGAGGAAAT
ATGAAGGACAATTGGAGAAGTGAATTATATAAATATAAAGTAGTAAAAATTGAACCATTAGGAGTAGCACCCACCAAGGC
AAAAAGAAGAGTGGTGCAGAGAGAAAAAAGAGCAGTGGGAATAGGAGCTCTGTTCCTTGGGTTCTTGGGAGCAGCAGGAA
GCACTATGGGCGCAGCGTCACTGACGCTGACGGTACAGACCAGACAATTATTGTCTGGTATAGTGCAGCAGCAGAACAAT
CTGCTGAGGGCTATTGAGGCGCAACAGCATCTGTTGCAACTCACAGTCTGGGGCATCAAGCAGCTCCAGGCAAGAGTCCT
GGCTGTGGAAAGATACCTAAAGGATCAACAGCTCCTGGGGATTTGGGGTTGCTCTGGAAAACTCATTTGCACCACTACTG
TGCCTTGGAATGCTAGTTGGAGTAATAAATCTCTGGATGATATTTGGCAGAACATGACCTGGATGGAGTGGGAAAGAGAA
ATTGACAATTACACAAATGTAATATACAATTTAATTGAAGAATCGCAGAACCAGCAAGAAAAGAATGAACAAGACTTATT
AGCATTGGATAAATGGGCAAGTTTGTGGGATTGGTTTAGCATATCAAACTGGCTGTGGTATATAAAAATATTCATAATGA
TAGTAGGAGGCTTGATAGGTTTAAGAATAATTTTTACTGTACTTTCTATAGTGAATAGAGTTAGGCAGGGATACTCACCA
TTATCGTTTCAGACCCGCTTCCCAGCCCCGAGGGGACCCGACAGGCCCGAAGGAATCGAAGAAGGAGGTGGAGAGAAAGA
CAGAGACAGATCCGGGCTATTAGTGAACGGATTCTTTGCACTTATCTGGGTGGACCTACGGAGCCTGTGCCTCTTCAGCT
ACCACCGCTTGAGAGACTTACTCTTGATTGCAGCGAGAATTGTGGAGCTTCTGGGACGCAGGGGGTGGGAAATCCTCAAG
TATTGGTGGAATCTCCTGCAGTATTGGAGTCAGGAACTAAAGAATAGTGCTGTTAGCTTGCTTAATGTCACAGCCATAGC
AGTAGCTGAGGGGACAGATAGGATTCTAGAAGTATTACAAAGAGCTTATAGAGCTATTATTCACATACCTAGAAGAATAA
GACAGGGCTTAGAAAGGGCTTTGCTATAA

Fig. 12

96USSN20 (SEQ ID NO: 21)

ATGAGAGTGAAGGGGACACAGAAGAGTTATCCACTCTTATGGAGGTGGGGTATAATATTTTGGATAATGGTAATTTGTAA
TGCTGAAAATTTGTGGGTCACGGTCTATTATGGGGTACCTGTGTGGAGAGACGCAGAGACCACCTTATTTTGTGCATCAG
ATGCTAAAGCATATGATACAGAAGTACATAATGTTTGGGCTACACATGCCTGTGTACCCACAGACCCTAACCCACAAGAA
ATACCTTTGGAAAATGTAACAGAAAATTTTAATATGTGGAAAAATAACATGGTAGAGCAGATGCATGAAGATATAATTGA
TCTATGGGACCAAAGCCTAAAGCCATGTGTAAAGTTAACCCCTCTCTGTGTTACTTTAAATTGCCATAACTTCAATAACT
TCAATAGCAGCAATAACAGCACCCCTATCAACAACACCATATATAATGGCATGCAAGGGGAAATAAAAAATTGCTCTTTC
AATACAACCACAGAATTAAGAGGTAAGACAAAGAAACAGTATGCACTTTTTAATAAACTTGATGTAGTACAAATTAATGA
TAAGAATAATAGTCATAGTAATAATAGACGGTATATGTTAATACATTGTAATACCTCAACCATTACACAGGCTTGTCCAA
AGGTAACCTTTGAGCCAATTCCCATACATTATTGTGCCCCAGCTGGTTTTGCAATTCTAAAATGTAAGGATCAGGAGTTC
AATGGATCAGGACCATGCAACAATGTCAGCACAGTACAATGCACACATGGAATCAAGCCAGTAGTATCAACTCAGCTGCT
GTTAAATGGCAGTCTAGCAGAAAGAAAAATAATGATTAGATCTGAAAATATCACAAACAATGCCAAGACCATAATAGTAC
AGTTCACTGAGCCTGTAGAAATTAATTGTACCAGACCTAACAACAATACAAGAAAAAGGGTAGGTGTAGGACCAGGGCGA
GCAGTCTATGTAACAAATGCCATAATAGGGGATATAAGACAAGCACATTGTAATGTCAGCAGAGCAAAATGGAATGACAC
TTTAAAGAAGGTAGTTACACAATTAAGGAAGCACTTTAACACAACAATAGTCTTTACTAAACCCTCAGGAGGGGATGTGG
AAATTACAACACATAGTTTTAACTGTGGAGGAGAATTTTTCTATTGCAATACATCACAACTGTTTAATAGCACTTGGTAT
ATCAATGGCACAAACCACACAGGGCCATATGACACTGACACTATAACTCTCCGATGCAGAATAAAGCAAATTGTAAAAAC
ATGGCAGAGAGTAGGACAAGCAATGTATGCTCCTCCCATCCCAGGAGTAATAAGGTGTGACTCAAACATTACAGGAATAT
TATTAACAAGAGATGGAGGGAAAATTAATAGTACAAATGAGACTTTCAGGCCTGGAGGAGGAGATATGAGGGACAATTGG
AGAAGTGAATTATATAAGTATAAAGTAGTAAAAATTGAACCACTAGGTGTAGCACCCACCCATGCAAAAAGAAGAGTGGT
GGAGAGAGAAAAAAGAGCAGTTGGAGTAATAGGAGCTGTCTTCCTTGGGTTCTTAGGAGCAGCAGGAAGCACTATGGGCG
CAGCGGCAATAACGCTGACGGTACAGGCCAGACAATTATTGTCTGGTATAGTGCAACAGCAGAGCAATCTGCTGAGGGCT
ATAGAGGCTCAACAGCATCTGTTGAAACTCACGGTCTGGGGCATTAAACAGCTCCAGGCAAGAGTCCTGGCTCTGGAAAG
ATACCTAAGGGATCAACAGCTCCTAGGAATTTGGGGCTGCTCTGGAAAGCTCATCTGCACCACTAATGTACCCTGGAATT
CTAGTTGGAGTAATAAAACTTTTAATGACATATGGAATAACATGACCTGGTTACAATGGGATAAAGAAATTAACAATTAC
ACAAACACAATATATCGTCTAATTGAAGAATCGCAGAACCAGCAGGAAAAGAATGAACAAGATTTATTGGCATTGGACAA
GTGGGCAAGTCTGTGGAGTTGGTTTGACCTATCAAATTGGCTATGGTATATAAGAATATTTATAATGGTAGTAGGAGGTT
TGATAGCTTTAAGAATAGTTTTTGCTGTGCTTGCTATAATAAATAGAGTTAGGCAGGGATACTCACCTCTATCATTCCAG
ACCCTTACCCACCACCAGAGGGAACCCGACAGGCCCGAAGGAATCGAAGAAGGAGGTGGCGAGCAAGACAGAGACAGGTC
CGTGAGATTAGTGAACGGATTCTTAGCTCTTGCCTGGGACGATCTACGGAGCCTGTGCCTCTTCAGCTACCACCGATTGA
GAGACTTACTCTTGATTGCAGCGAGGACTGTGGAACTTCTGGGACACAGCAGTCTCAAGGGACTGAGACTGGGGTGGGGA
GCCCTCAAATATCTGTGGAATCTTCTGTCATACTGGGGCCAGGAACTAAAGAATAGTGCTATTAATCTGCTTGATACAAC
AGCAATAGCAGTAGCTAATTGGACAGACAGAGTTATAGAAATAGGACAAAGATTTGGTAGAGCTATTCTCAATATACCTA
GAAGAATCAGACAGGGCCTCGAAAGGGCTTTGCAATAA

Fig. 13